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Southern Nuclear Operating Company  
*the southern electric system*

Dave Morey  
Vice President  
Farley Project

September 15, 1994

Docket No.: 50-348

10 CFR 50.73

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Joseph M. Farley Nuclear Plant - Unit 1  
Licensee Event Report No. 94-004-00 - Valve Actuator Spacer Bolts

Gentlemen:

Joseph M. Farley Nuclear Plant Licensee Event Report No. 94-004-00 is being submitted voluntarily.  
If you have any questions, please advise.

Respectfully submitted,

Dave Morey

EFB/clt:lerMSIV do:

Enclosure

cc: Mr. S. D. Ebnetter  
Mr. B. L. Siegel  
Mr. T. M. Ross

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NRC FORM 366 (6-89)		U.S. NUCLEAR REGULATORY COMMISSION																														APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92																											
LICENSEE EVENT REPORT (LER)																																								ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.																			
FACILITY NAME (1) Joseph M. Farley Nuclear Plant - Unit 1																									DOCKET NUMBER (2) 0 5 0 0 0 3 4 8										PAGE (3) 1 OF 4																								
TITLE (4) Valve Actuator Spacer Bolts Found to be of Incorrect Material																																																											
EVENT DATE (5)										LER NUMBER (6)										REPORT DATE (7)										OTHER FACILITIES INVOLVED (8)																													
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																											
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																																																											
<p>On or about June 2, 1994, during metallurgical examination of failed valve actuator spacer bolts, it was determined that incorrect material had been used in the bolts' manufacture. The failed bolts had rendered the 1A Main Steam Isolation Bypass valve inoperable. Previously, on April 10, 1994, while in a refueling outage, Operations personnel had manually closed the valve in order to verify the valve position. In the process, the force applied by the manual handwheel caused the failure of two of the four actuator spacer bolts and deformed the two remaining bolts. The valve actuator was repaired during the outage.</p> <p>The vendor's drawing shows the spacer bolts as being made from ASTM-A-193 grade B7 material. However, when the failed bolts were tested it was determined that they were made of a mild carbon steel of the ASTM-A-108 family. The most probable cause of the bolts' failure appears to be the yield strength of the incorrect (ASTM-A-108 family) material used in the assembly of the actuator being exceeded by the force applied by way of the manual handwheel.</p> <p>Corrective action for this event included administratively restricting the use of the manual handwheel on all valves of this style (a total of sixteen ), performing a torque preload test, and an engineering evaluation which determined the acceptability of the existing bolts on these valves when operated by the air actuator. All valves of this style will have the spacer bolts replaced with the correct material.</p>																																																											

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

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Joseph M. Farley Nuclear Plant - Unit 1

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YEAR

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9 | 4 | -

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TEXT (If more space is required, use additional NRC Form 366A's)(17)

Plant and System Identification

Westinghouse -- Pressurized Water Reactor

Energy Industry Identification System codes are identified in the text as [XX].

Summary of Event

Two of the four actuator spacer bolts on the 1A Steam Generator Main Steam Isolation Bypass Valve (Q1N11V003D) failed during manual closure of the valve. The spacer bolts were subsequently determined to be made of lesser strength material than that specified on the vendor drawing.

Description of Event

On April 10, 1994 at 0100 while in a refueling outage on Unit 1, Operations personnel manually checked closed the 1A Steam Generator Main Steam Isolation Bypass valve [SB] in order to verify the valve position. In the process, the force applied by the manual handwheel failed two of the four actuator spacer bolts and deformed the two remaining bolts. The spacer bolts' failure rendered the bypass valve inoperable. This valve is a Velan, 3 inch, 600 psi, "Pressure Seal (PS) Gate Valve", with a Cowan Dynamics air operated actuator. The actuator has the capability of manual operation by way of a handwheel/gear box combination.

Subsequently, on or about June 2, 1994 with both Units at one hundred percent power, chemical analysis and hardness testing of the failed spacer bolts revealed that the material was a mild carbon steel in the ASTM-A-108 family, and not ASTM-A-193 grade B7 as stated on the vendor drawings. The A-108 family material has a yield strength significantly less than the A-193 grade B7 material. A review of the vendor seismic calculation revealed that all expected load combinations for air operator actuation would not have caused the yield strength to be exceeded for the A-108 family material that was installed. A calculation was performed to estimate the torque that would be required on the manual handwheel to cause the spacer bolts to fail, assuming that they were incorrectly manufactured from the ASTM-A-108 family material. It was concluded that the torque which could reasonably be applied by the manual handwheel could cause failure of the bolts which were made of the ASTM-A-108 family material.

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TEXT (If more space is required, use additional NRC Form 366A's)(17)

A review of maintenance history showed no previous problems or replacements of this valve's spacer bolts. A search of Farley Nuclear Plant stock showed that there were none of these bolts in the store room, and that there had not been any in the past. It is most likely that the bolts manufactured of the ASTM-A-108 family material were part of the valve actuator when it was originally supplied. Southern Nuclear contacted the vendor regarding these spacer bolts. The vendor could not say with assurance that the spacer bolts were, in fact, made of the material as specified on the vendor drawing.

A review of plant records indicated that this same type actuator exists in eight locations in each FNP Unit. These locations are the six Main Steam Isolation Valve Bypass Valves in each unit (the bolts that failed were in one of these locations on Unit 1) and the two Turbine Driven Auxiliary Feed Water Pump (TDAFP) Turbine steam admission valves [SB] in each unit. The four bolts of the 1A Steam Generator Main Steam Isolation Bypass Valve were replaced with bolts of the proper material (ASTM-A-193 grade B7). One of the four TDAFP Turbine steam admission valves has had its bolts replaced.

Cause of Event

The most probable cause of the bolts' failure is exceedance of the yield strength of the incorrect (ASTM-A-108 family) bolt material through the force applied by way of the manual handwheel.

Safety Assessment and Reportability

It has been determined through engineering calculations and through verification of preload torque on the bolts that have not been replaced that they have performed and will perform their intended function for all design scenarios of air operator actuation. The load capable of being applied to the bolts by operation of the manual handwheel was addressed administratively by restricting the use of the handwheels.

Based on the above, Southern Nuclear determined that the health and safety of the public was not affected, and the event does not constitute a reportable condition under 10CFR50.72 or 10CFR50.73.

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TEXT (If more space is required, use additional NRC Form 366A's)(17)

Corrective Action

The sixteen valves having this type actuator were checked to verify sufficient preload on the spacer bolts. This determined that they would perform their intended function for all design scenarios of air operator actuation.

Bolts of the correct material have been installed in the actuator that failed (1A Steam Generator Main Steam Isolation Valve Bypass), and in one of the four TDAFP Turbine steam admission valves.

The spacer bolts on the remaining eleven Main Steam Isolation Valve Bypasses will be replaced during upcoming outages. The spacer bolts on the remaining three Turbine Driven Auxiliary Feedwater Pump Turbine steam admission valves will be replaced as plant conditions permit, not to exceed the next refueling outage of the respective Unit. Prior to the bolts' replacement the potential for over stressing the bolts with the manual handwheel will be controlled by administrative means.

Additional Information

No other equipment failed during this event.

No other similar LERs have been reported from Farley Nuclear Plant.

This event would not have been more severe if it had occurred under different operating conditions.